



(12) **United States Patent**
Weight et al.

(10) **Patent No.:** **US 6,945,800 B2**
(45) **Date of Patent:** **Sep. 20, 2005**

(54) **CONSTANT FORCE APPARATUS AND METHOD**

(75) Inventors: **Brent Weight**, Springville, UT (US);
Chris A. Mattson, Troy, NY (US);
Spencer P. Magleby, Provo, UT (US);
Larry L. Howell, Orem, UT (US);
Bradford J. Brown, Salem, UT (US)

(73) Assignee: **Brigham Young University**, Provo, UT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/450,668**

(22) PCT Filed: **Dec. 14, 2001**

(86) PCT No.: **PCT/US01/48188**

§ 371 (c)(1),
(2), (4) Date: **Jan. 15, 2004**

(87) PCT Pub. No.: **WO02/49159**

PCT Pub. Date: **Jun. 20, 2002**

(65) **Prior Publication Data**

US 2004/0137785 A1 Jul. 15, 2004

Related U.S. Application Data

(60) Provisional application No. 60/256,030, filed on Dec. 15, 2000.

(51) Int. Cl.⁷ **H01R 13/44**

(52) U.S. Cl. **439/136; 361/686**

(58) **Field of Search** 361/683–686;
439/136–138, 142, 145, 159, 341, 376

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,969,830	A	*	11/1990	Daly et al.	439/136
5,694,292	A	*	12/1997	Paulsel et al.	361/686
5,933,322	A	*	8/1999	Ruch et al.	361/686
6,069,790	A	*	5/2000	Howell et al.	361/686
6,115,242	A		9/2000	Lambrecht	
6,123,557	A		9/2000	Wang et al.	
6,135,801	A		10/2000	Helot et al.	

* cited by examiner

Primary Examiner—Tuyen T Nguyen

(74) *Attorney, Agent, or Firm*—Thorpe North & Western LLP

(57) **ABSTRACT**

A constant force apparatus having a cam (12) with a non-planar surface (13), a compliant member (14) with a free end (18), a fixed end (16), and an intermediate contact area (20) therebetween, wherein the free end (18) of the compliant member (14) slidably engages the non-planar surface (13) of the cam (12) and the compliant member (14) provides a substantially constant reaction force at the intermediate contact area (20) regardless of displacement (22) of the intermediate contact area (20). The compliant member (14) can further include a material capable of conducting electricity for use as an electrical contact. The apparatus can further comprise a docking station for use with a dockable unit to accept the dockable unit and provide an electrical connection thereto.

30 Claims, 3 Drawing Sheets

